AMENDMENTS TO THE CLAIMS

(including complete listing of the claims)

1. (Currently Amended) ~~A method for continually or continuously measuring an analyte present in a biological system, said method comprising~~ The method of claim 28, wherein for the

~~(a) transdermally extracting the analyte from the biological system using a sampling system that is in operative contact with a skin or mucosal surface of said biological system;~~

~~(b) obtaining a raw signal from the extracted analyte, wherein said raw signal is specifically related to the analyte;~~

~~(c) performing a calibration step which correlates the raw signal obtained in step (b) with a measurement value indicative of the concentration of analyte present in the biological system at the time of extraction;~~

~~(d) repeating steps (a)-(b) to obtain a series of measurement values at selected time intervals, wherein the sampling system is maintained in operative contact with the skin or mucosal surface of said biological system to provide for a continual or continuous analyte measurement; and~~

~~(e)~~ predicting a measurement value based on the series of measurement ~~values using the~~ Mixtures of Experts algorithm, ~~where~~ the individual experts have a linear form

$$An = \sum_{i=1}^{n} An_i w_i \qquad (1)$$

wherein (An) is an analyte of interest, n is the number of experts, An_i is the analyte predicted by Expert i; and w_i is a parameter, and the individual experts An_i are further defined by the expression shown as Equation (2)

$$An_i = \sum_{j=1}^{m} a_{ij} P_j + z_i \qquad (2)$$

wherein, An_i is the analyte predicted by Expert i; P_j is one of m parameters, m is typically less than 100; a_{ij} are coefficients; and z_i is a constant; and further where the weighting value, w_i, is defined by the formula shown as Equation (3)

$$w_i = \frac{e^{d_i}}{\left[\sum_{k=1}^{n} e^{d_k}\right]} \qquad (3)$$

where e refers to the exponential function, ~~and the d_k (note that the d_i in the numerator of Equation 3 is one of the d_k) are a parameter set analogous to Equation 2 that is used to determine the weights w_i. The~~ and d_k are given by Equation 4

$$d_k = \sum_{j=1}^{m} \alpha_{jk} P_j + \omega_k \qquad (4)$$

where α_{jk} is a coefficient, P_j is one of m parameters, and where ω_k is a constant.

2-4. (Canceled)

5. (Currently Amended) The method of claim 25 4, wherein the analyte is glucose.

6-14. (Canceled)

15. (Currently Amended) A monitoring system for ~~continually or continuously~~ measuring an amount or concentration of analyte present in a biological system, said

system comprising, in operative combination:

~~(a) sampling means for continually or continuously extracting the analyte from the biological system, wherein said sampling means is adapted for extracting the analyte across a skin or mucosal surface of said biological system;~~

~~(b)~~ a sensing device means in operative contact with the analyte ~~extracted by the sampling means~~, wherein said sensing device means obtains a raw signal from the ~~extracted~~ analyte and said raw signal is specifically related to the amount or concentration of analyte; and

~~(c)~~ one or more microprocessors ~~means~~ in operative communication with ~~the sampling means and~~ the sensing device means, wherein said one or more microprocessors comprises programming to control means (i) ~~is used to control the sampling means and~~ operation of the sensing device; and ~~means to obtain a series of raw signals at selected time intervals during a continual or continuous measurement period; (ii) correlate the raw signals with measurement values indicative of the concentration of analyte present in the biological system, and (iii) predict a measurement value using the Mixtures of Experts algorithm, where the individual experts have a linear form~~

$$An = \sum_{i=1}^{n} An_i w_i \qquad (1)$$

~~wherein (An) is an analyte of interest, n is the number of experts, An_i is the analyte predicted by Expert i, and w_i is a parameter, and the individual experts An_i are further defined by the expression shown as Equation (2)~~

$$An_i = \sum_{j=1}^{m} a_{ij} P_j + z_i \qquad (2)$$

~~wherein, An_i is the analyte predicted by Expert i; P_j is one of m parameters, m is typically less than 100; a_{ij} are coefficients; and z_i is a constant; and further where the weighting value, w_i, is defined by the formula shown as Equation (3)~~

$$w_i = \frac{e^{d_i}}{\left[\sum_{k=1}^{n} e^{d_k}\right]} \qquad (3)$$

~~where e refers to the exponential function and the d_k (note that the d_i in the numerator of Equation 3 is one of the d_k) are a parameter set analogous to Equation 2 that is used to determine the weights w_i. The d_k are given by Equation 4~~

$$d_k = \sum_{j=1}^{m} \alpha_{jk} P_j + \omega_k \qquad (4)$$

~~where α_{jk} is a coefficient, P_j is one of m parameters, and where ω_k is a constant.~~

(ii) providing two or more ranges of measurement values, wherein said measurement values are indicative of amounts or concentrations of analyte present in the biological system;

identifying the range in which a selected measurement value falls; and

employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range.

16-24. (Canceled)

25. (New) A method for measuring an amount or concentration of analyte present in a biological system, said method comprising:

determining a measurement value indicative of the amount or concentration of analyte present in the biological system;

providing two or more ranges of measurement values;

identifying the range in which said determined measurement value falls;

employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range; and

measuring amount or concentration of analyte present in the biological system using said algorithm.

26. (New) The method of claim 25, wherein said determining a measurement value indicative of the amount or concentration of analyte present in the biological system comprises obtaining a raw signal specifically related to analyte amount or concentration in the biological system and correlating the raw signal with a measurement value.

27. (New) The method of claim 25, wherein said determining is carried out using a Mixtures of Experts algorithm and said Mixtures of Experts algorithm is trained using a global training set.

28. (New) The method of claim 25, wherein said algorithm for prediction of further measurement values is a Mixtures of Experts algorithm and said Mixtures of Experts algorithm is trained using data from the identified range.

29. (New) The method of claim 25, further comprising identifying in which range one or more of the further measurement values falls, and

employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range.

30. (New) One or more microprocessors for use in an analyte monitoring system for measuring an amount or concentration of analyte present in a biological system, said one or more microprocessors comprising programming to control:

providing two or more ranges of measurement values, wherein said measurement values are indicative of amounts or concentrations of analyte present in the biological system;

identifying the range in which a selected measurement value falls; and

employing an algorithm for prediction of further measurement values wherein said algorithm is optimized for performance in the identified range.

31. (New) The one or more microprocessors of claim 30, wherein a Mixtures of Experts algorithm is used to determine said selected measurement value and said Mixtures of Experts algorithm is trained using a global training set.

32. (New) The one or more microprocessors of claim 30, wherein said algorithm for prediction of further measurement values is a Mixtures of Experts algorithm and said Mixtures of Experts algorithm is trained using data from the identified range.

33. (New) The one or more microprocessors of claim 30, wherein said one or more microprocessors are further programmed to control operation of a sensing device that provides raw signal specifically related to analyte amount or concentration in the biological system.

34. (New) The one or more microprocessors of claim 33, wherein said one or more microprocessors are further programmed to control correlating the raw signal with a measurement value indicative of analyte amount or concentration in the biological system.

35. (New) The one or more microprocessors of claim 32, wherein for the Mixtures of Experts algorithm the individual experts have a linear form

$$An = \sum_{i=1}^{n} An_i w_i \qquad (1)$$

wherein (An) is an analyte of interest, n is the number of experts, An_i is the analyte predicted by Expert i; and w_i is a parameter, and the individual experts An_i are further

defined by the expression shown as Equation (2)

$$An_i = \sum_{j=1}^{m} a_{ij} P_j + z_i \qquad (2)$$

wherein, An_i is the analyte predicted by Expert i; P_j is one of m parameters, m is typically less than 100; a_{ij} are coefficients; and z_i is a constant; and further where the weighting value, w_i, is defined by the formula shown as Equation (3)

$$w_i = \frac{e^{d_i}}{\left[\sum_{k=1}^{n} e^{d_k}\right]} \qquad (3)$$

where e refers to the exponential function, d_i is one of the d_k, and d_k are given by Equation 4

$$d_k = \sum_{j=1}^{m} \alpha_{jk} P_j + \omega_k \qquad (4)$$

where α_{jk} is a coefficient, P_j is one of m parameters, and where ω_k is a constant.

36. (New) The one or more microprocessors of claim 30, wherein the analyte is glucose.

37. (New) The monitoring system of claim 15, wherein a Mixtures of Experts algorithm is used to determine said selected measurement value and said Mixtures of Experts algorithm is trained using a global training set.

38. (New) The monitoring system of claim 15, wherein said algorithm for prediction of further measurement values is a Mixtures of Experts algorithm and said

Mixtures of Experts algorithm is trained using data from the identified range.

39. (New) The monitoring system of claim 15, wherein said sensing device provides a raw signal specifically related to analyte amount or concentration in the biological system and said one or more microprocessors are further programmed to control correlating the raw signal with a measurement value indicative of analyte amount or concentration in the biological system.

40. (New) The monitoring system of claim 15, wherein for the Mixtures of Experts algorithm the individual experts have a linear form

$$An = \sum_{i=1}^{n} An_i w_i \qquad (1)$$

wherein (An) is an analyte of interest, n is the number of experts, An_i is the analyte predicted by Expert i; and w_i is a parameter, and the individual experts An_i are further defined by the expression shown as Equation (2)

$$An_i = \sum_{j=1}^{m} a_{ij} P_j + z_i \qquad (2)$$

wherein, An_i is the analyte predicted by Expert i; P_j is one of m parameters, m is typically less than 100; a_{ij} are coefficients; and z_i is a constant; and further where the weighting value, w_i, is defined by the formula shown as Equation (3)

$$w_i = \frac{e^{d_i}}{\left[\sum_{k=1}^{n} e^{d_k}\right]} \qquad (3)$$

where e refers to the exponential function, d_i is one of the d_k, and d_k are given by Equation 4

$$d_k = \sum_{j=1}^{m} \alpha_{jk} P_j + \omega_k \qquad (4)$$

where α_{jk} is a coefficient, P_j is one of m parameters, and where ω_k is a constant.

41. (New) The monitoring system of claim 15, wherein the analyte is glucose.